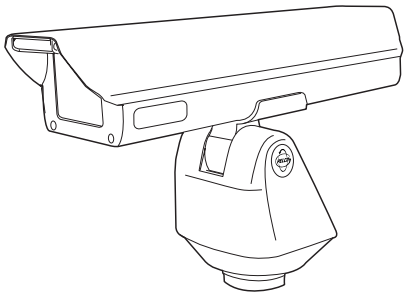

PT780-24P/PPPSA
PT780-24SL/PPSA
Pan/Tilts

Installation/
Operation Manual

C342M-PSA (11/98)

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REVISION HISTORY

Manual #	Date	Comments
C342M-PSA	1/97	Original version.
	9/97	Revised Figure 17 to move note A from pin 30 to pins 9 and 14. Revised Table A to show that pins 30 and 4 are used for sync signal and that pins 9 and 14 are not used on ENGPT780-24SL/P. Changed manual to new format.
	12/97	Changed ENGPT780-24P/PP to PT780-24P/PPPSA and changed ENGPT780-24SL/P to PT780-24SL/PPSA.
	11/98	Revised procedures in Section 5.0, Maintenance. Repaginated manual.

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1.1 IMPORTANT SAFEGUARDS AND WARNINGS

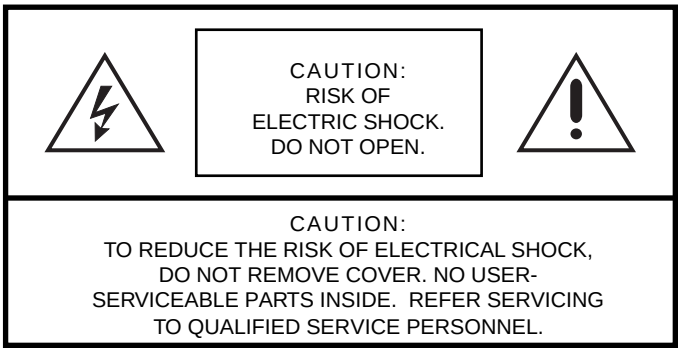
Prior to installation and use of this product, the following WARNINGS should be observed.

1. Installation and servicing should only be done by qualified service personnel and conform to all local codes.
2. The weight of the camera/lens and enclosure shall not exceed 52 lb (23.59 kg).
3. Only use replacement parts recommended by Pelco.
4. After replacement/repair of this unit's electrical components, conduct a resistance measurement between line and exposed parts to verify the exposed parts have not been connected to line circuitry.
5. The installation method and materials should be capable of supporting four times the weight of the enclosure, pan/tilt, camera and lens combination.

The product and/or manual may bear the following marks:

This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.

This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.



Please thoroughly familiarize yourself with the information in this manual prior to installation and operation.

2.0 DESCRIPTION

The PT780-24P/PPPSA and PT78024SL/PPSA pan/tilt units are designed for medium-duty, indoor/outdoor use.

The PT780-24P/PPPSA pan/tilt is designed for use with the EH4718L/WPSA and EH4718L/PSA environmental enclosures.

The PT780-24SL/PPSA pan/tilt is designed for use with the EH4718LDB/WPSA environmental enclosure.

Pelco's RediLINK™ connector makes it simple and quick to install an enclosure. The weight of the enclosure with camera and lens must not exceed 52 pounds (23.56 kg).

You can easily remove the clamshell covers from the sides of the pan/tilt units to access all internal parts without having to remove the camera enclosure. This makes it easy to service the units and to adjust the pan and tilt limit stops.

2.1 MODELS

PT780-24P/PPPSA	Heavy-duty, indoor/outdoor pan/tilt with preset positioning capabilities. 24 VAC.
PT780-24SL/PPSA	Medium-duty, indoor/outdoor pan/tilt with preset positioning capabilities and 360° pan rotation. 24 VAC.

3.0 INSTALLATION

3.1 MOUNTING

NOTE: To insure proper wiring and operation of your equipment, it is recommended that you test the pan/tilt unit and associated equipment in your facility before installing it in the field. Refer to Sections 3.2 through 3.4.

CAUTION: The PT780 pan/tilt units are designed for upright or inverted (base up) operation. Never mount the pan/tilt horizontally.

NOTE: If you mount your pan/tilt unit in the inverted position, you must install a rain cover (part number 90010019).

Attach the pan/tilt unit to a wall or ceiling mount. Follow the instructions that are provided with the mount. Make sure the mounting surface and the selected mount can support four times the combined weight of the pan/tilt unit and the camera enclosure (including the camera and lens). The pan/tilt unit weighs approximately 21.5 pounds (9.68 kg). Refer to the manuals for your enclosure, camera, and lens for the weights of those items.

Proceed to Section 3.2, ENCLOSURE INSTALLATION.

3.2 ENCLOSURE INSTALLATION

Attach the camera enclosure to the pan/tilt unit. Follow the instructions that are provided with the enclosure.

Proceed to Section 3.3, ELECTRICAL INSTALLATION.

3.3 ELECTRICAL INSTALLATION

3.3.1 LRD41A11-X Legacy Receiver/Drivers

WARNING: To prevent damage to the wiper, if your enclosure has one, AC high to turn on the wiper (pin 25 of the 37-pin connector) must come from the same circuit that provides power to the wiper (pin 15 of the 37-pin connector). This is because the wiper and the on/off control share the same AC neutral (pin 16). See Figure 2.

Connect the 37-pin round connector from the pan/tilt unit to the mating connector on the receiver/driver.

3.3.2 All Control Equipment Except LRD41A11-X Legacy Receiver/Drivers

Make the interconnecting cable to link the 37-pin round connector from the pan/tilt unit to the control equipment.

For cable requirements, refer to the following tables:

Table A: Connector Pin Designations

Tables B and C: Requirements to Wire Power to Pan and Tilt Motors

To determine the size of wire to use for enclosure power (pins 15 and 16), add together the wattage of the camera and the wattage of the window wiper (if the enclosure has a wiper). The wattage of the wiper is 25 watts.

If the pan/tilt has the optional heater blanket, the heater blanket requires 40 watts of power (pins 31 and 32).

The following are some recommended common installation practices:

- For unshielded conductors, use jacketed, stranded, multiconductor cable, with additional conductors than needed for future servicing and/or additions. Use color-coded conductors for ease of wiring and to identify functions at a later date.
- Keep a wiring diagram with the system for later reference.

Refer to Figure 1 and the following steps to construct the end of the cable that connects to the pan/tilt unit:

1. Slide the unshielded and coaxial cables through the cable shell and rubber boot.
2. Strip one inch of the jacket from the cables.
3. For the unshielded conductors, strip 1/8 inch of insulation from the individual wires.
4. For the coax, unwrap the braid and twist it into a single conductor. Strip 1/8 inch of insulation from the center conductor. If you are using two coax cables - one for video output and one for camera synchronization - twist the braid from the two coax cables together.
5. Insert the end of each wire into a socket and crimp the end of the socket over the wire's insulation. This provides strain relief for the bare wire. Then crimp or solder the bare wire to the socket.
6. Refer to Table A and push each socket into the proper hole of the 37-pin connector until it snaps into place. Once a socket snaps into place, it can not be removed without a special AMP tool.
7. Slide the cable shell down the cabling and screw it to the 37-pin connector.
8. Screw the cable clamp to the cable shell.
9. Connect the 37-pin connector to the mating connector on the pan/tilt unit.
10. To make a watertight assembly, use RTV silicone (such as Bostik #9732 or equivalent) on both sides of the connector to fill any gaps between the cable clamp, shell, and cable.

Proceed to Section 3.4, PAN AND TILT LIMIT STOP ADJUSTMENTS.

WARNING: To prevent damage to the wiper, if your enclosure has one, AC high to turn on the wiper (pin 25 of the 37-pin connector) must come from the same circuit that provides power to the wiper (pin 15 of the 37-pin connector). This is because the wiper and the on/off control share the same AC neutral (pin 16). See Figure 2.

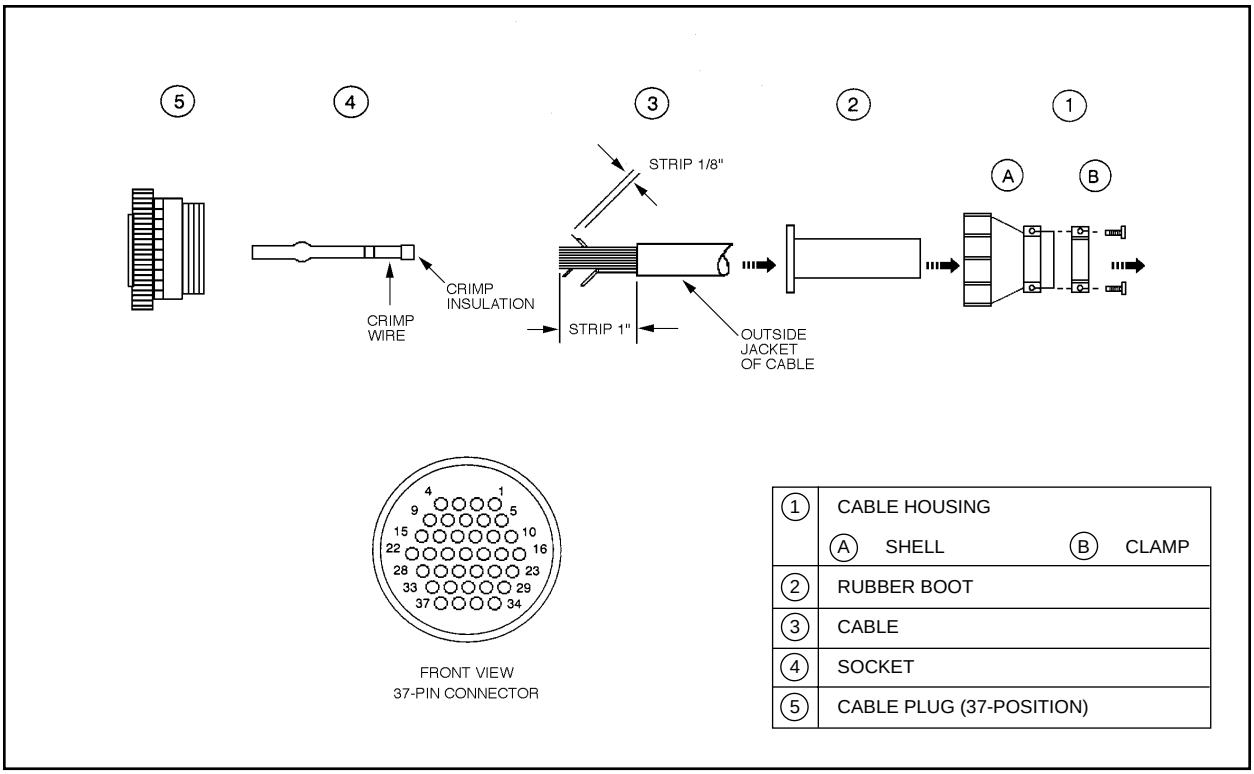


Figure 1. Connector Assembly

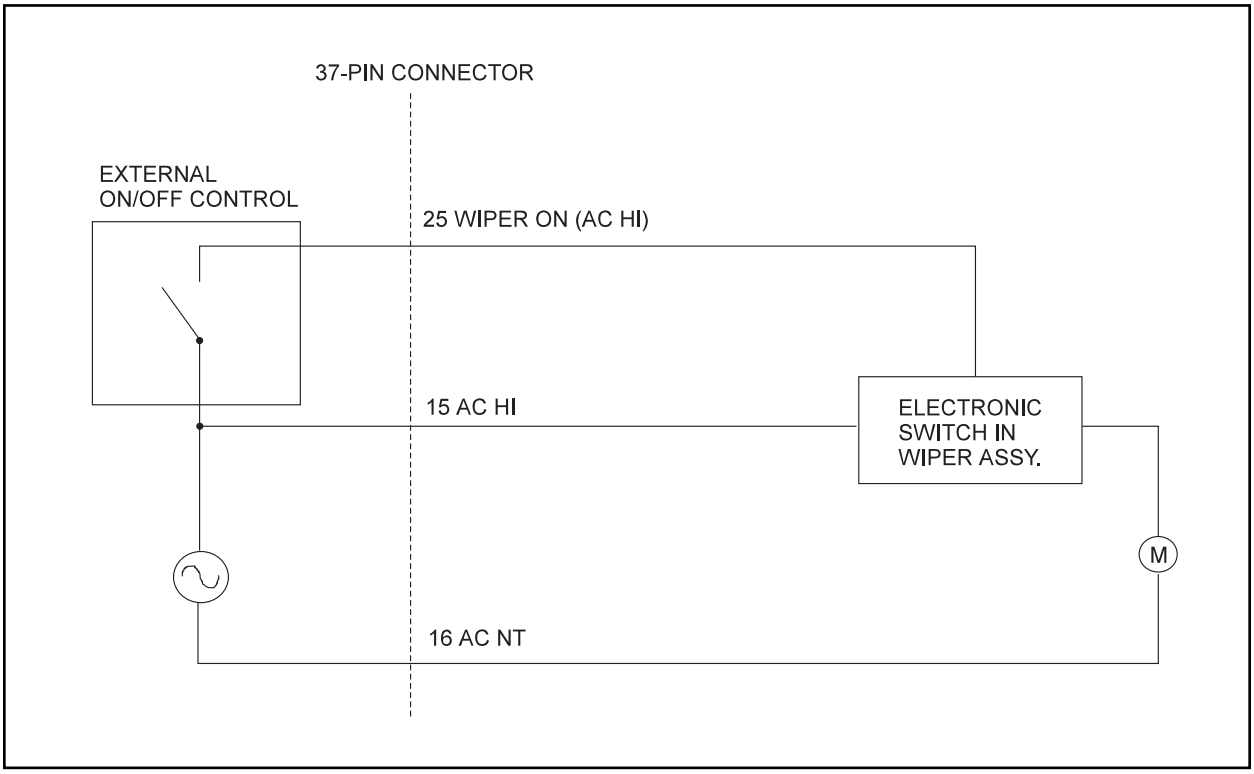


Figure 2. Wiper On/Off Connection

Table A. 37-Position Connector Pin Designations

Pin #	Function	ENGPT780-24P/PP	ENGPT780-24SL/P
Coaxial Cable			
27/4	Video Signal/Ground	•	•
30/4	Sync Signal/Ground	•	•
Unshielded Conductors			
3	Left	•	•
7	Right	•	•
6	Up	•	•
5	Down	•	•
1	Common	•	•
8	Safety Ground	•	•
10	Iris	•	
11	Focus	•	•
12	Zoom	•	•
9	Spare	•	
14	Spare	•	
13	Lens Common	•	•
15	Enclosure Power (AC High)	•	•
16	Enclosure Power (AC Neutral)	•	•
31	Heater Blanket (AC High)	(A)	(A)
32	Heater Blanket (AC Neutral)	(A)	(A)
25	Wiper	•	•
26	Spare	•	
17	Spare	•	
18	Spare	•	
28	PP Ground	•	•
29	PP 5V	•	•
34	PP Focus	•	•
35	PP Zoom	•	•
33	PP Pan	•	•
36	PP Tilt	•	•
37	PP SL		•

Pins 2 and 19-24 are not used.

NOTE: Operation of the pan/tilt unit at lower than 24 VAC will result in reduced load and speed capability.

Table B. Requirements to Wire Power to Pan and Tilt Motors

Wire Size	Maximum Cable Length*	
	6 Conductors**	**7 Conductors*****
24 VAC PT780-24P Models		
20 AWG	59 ft. (17.98 m)	118 ft. (35.96 m)
18 AWG	94 ft. (28.65 m)	188 ft. (57.30 m)
16 AWG	149 ft. (45.41 m)	298 ft. (90.83 m)

* Cable distances are based on:
26.4 VAC output from the controller and
10% cable loss with both motors (pan and tilt) running simultaneously

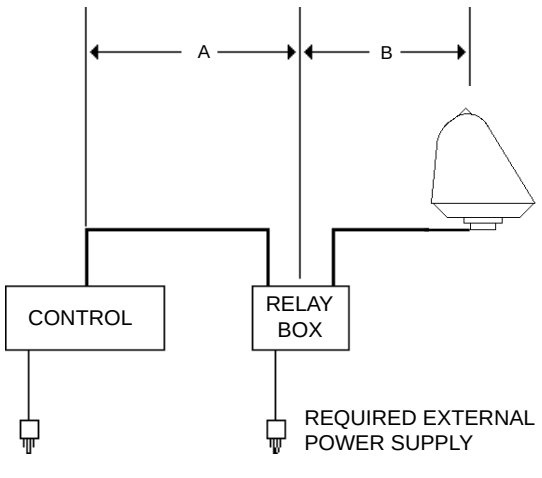
** Six conductors for operating pan and tilt motors:

Pin number in 37-pin connector	Function
3	Left
7	Right
6	Down
5	Up
1	Motor Common
8	Safety Ground

*** Same as six conductors except uses two wires for motor common.

Table C. Maximum Cable Distances Using RB24 or RB115 Relay Boxes

Wire Size	Maximum "A" Distance	Maximum "B" Distance
20 AWG*	5,800 ft. (1,768 m)	Use Table B
18 AWG	8,250 ft. (2,515 m)	
16 AWG	13,000 ft. (3,962 m)	



* Not recommended for reliable service between control and relay box..

3.4 PAN AND TILT LIMIT STOP ADJUSTMENTS

1. Remove the covers.

   a. Refer to Figure 3 and remove the Phillips screw on each side of the pan/tilt unit.

   b. Refer to Figure 4 and place your hands under the cover halves. Exert a strong, upward force to release the covers from their internal latching devices.

   c. Refer to Figure 5 and pull the cover halves away from the pan/tilt unit.

   d. Set the covers down or hang them by the eyelets inside the covers (refer to Figure 6). The wire and hook on which to hang the covers is not provided.

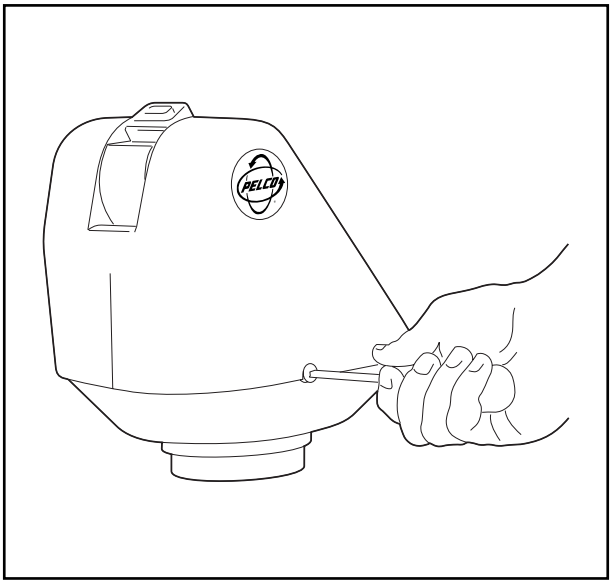


Figure 3. Removing the Screws

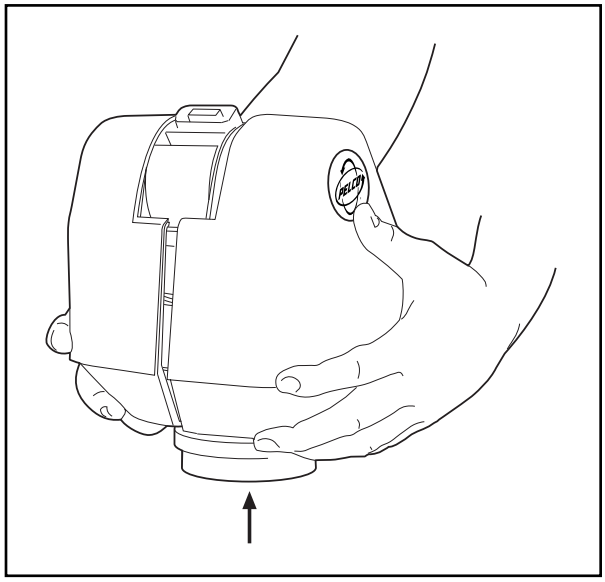


Figure 4. Releasing the Covers

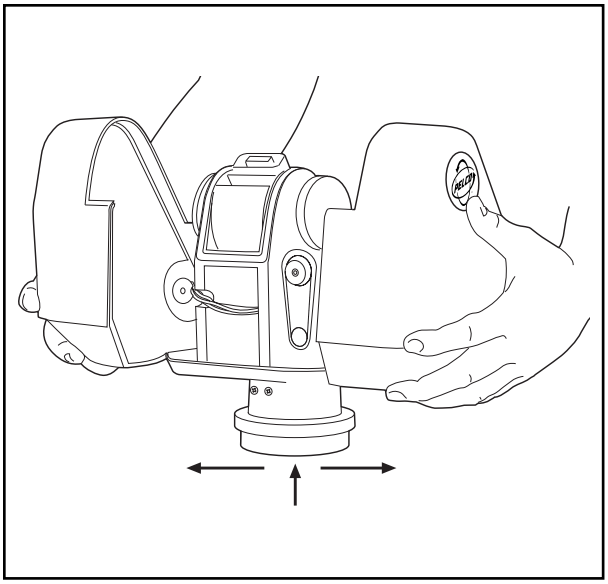


Figure 5. Removing the Covers

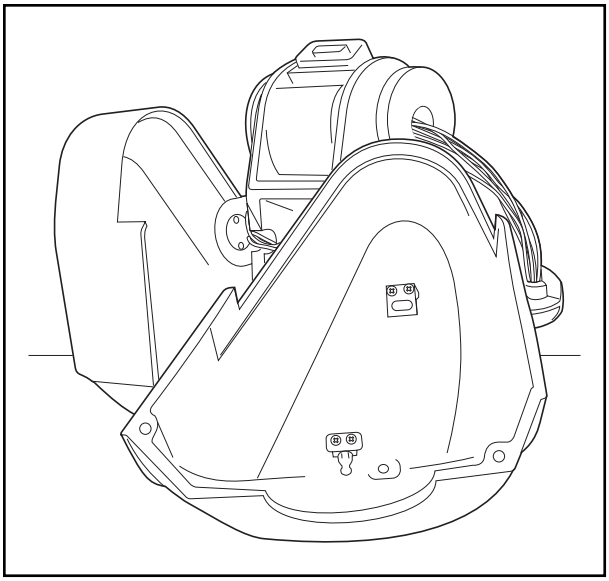


Figure 6. Hooking Cover Halves

2. Adjust the tilt limit stops.

   Refer to Figure 7 for the location of the tilt limit stops (item 7). Turn the control unit on and tilt the unit to the desired up position.

   Move the up limit cam until it touches the limit switch actuator. Push the cam against the actuator until it clicks, indicating that the limit switch has opened. Apply Lock-Tite™ to the set screw (item H) and tighten the screw on the cam.

   Operate the pan/tilt to the desired down position.

   Move the down limit cam until it touches the limit switch actuator. Push the cam against the actuator until it clicks, indicating that the limit switch has opened. Apply Lock-Tite™ to the set screw (item H) and tighten the screw on the cam.

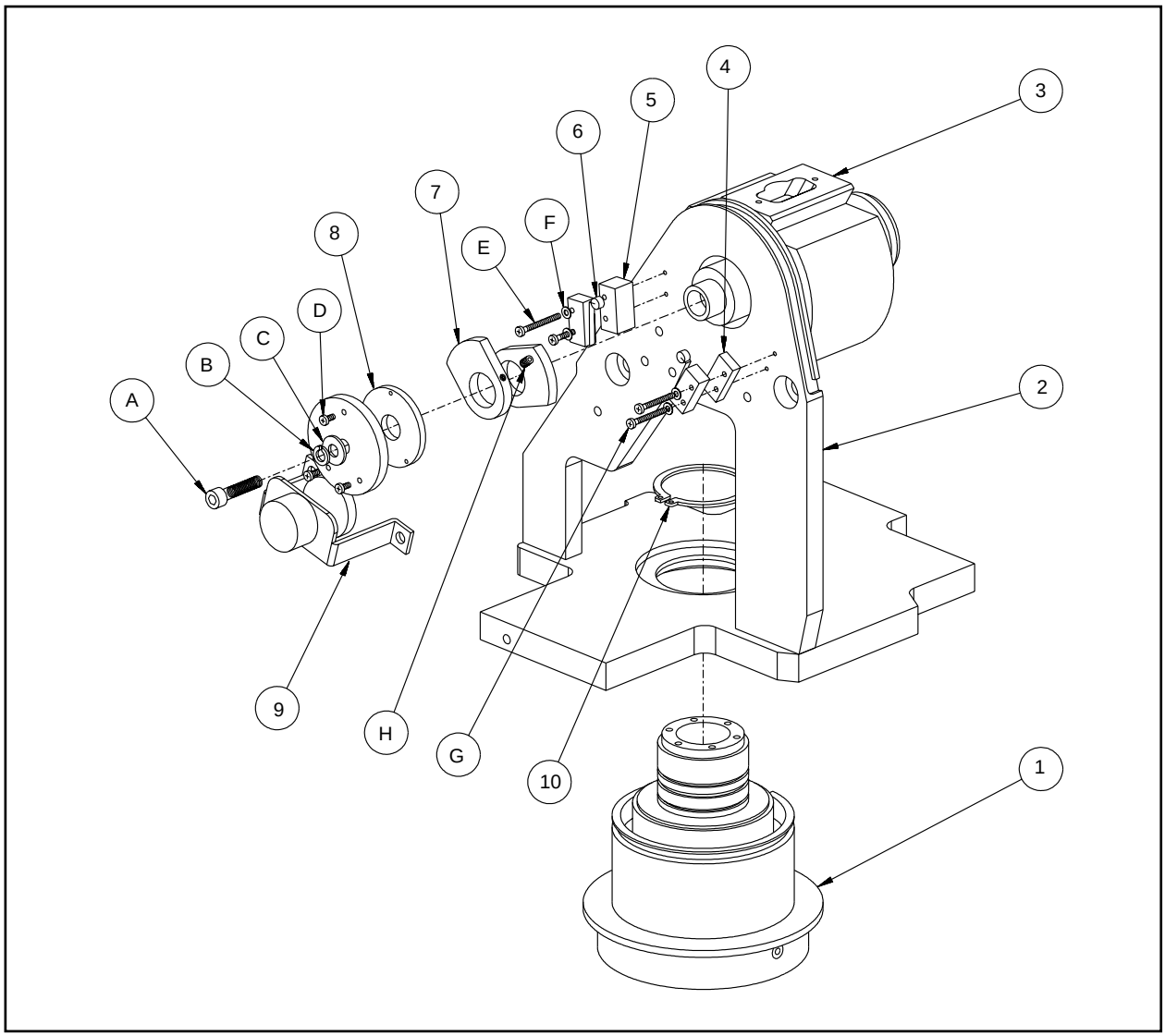


Figure 7. Tilt Limit Adjustment

NOTE: The SL model does not have pan limit stops.

CAUTION: Never loosen or remove the center stop. It is for protection of wiring inside the pan/tilt unit. If the center stop is loosened or removed, the wiring inside the pan/tilt unit will be damaged.

3. Adjust the pan limit stops.

   Refer to Figure 8 for the location of the pan limit stops. Turn the control unit on and pan the unit to the desired right limit stop.

   Move the right limit stop until it touches the limit switch actuator. Push the stop against the actuator until it clicks, indicating that the limit switch has opened. Tighten the screw on the stop.

   Operate the pan/tilt unit to check for exact positioning and adjust the stop if necessary.

   Operate the pan/tilt to the desired left limit stop.

   Move the left limit stop until it touches the limit switch actuator. Push the stop against the actuator until it clicks, indicating that the limit switch has opened. Tighten the screw on the stop.

   Operate the pan/tilt unit to check for exact positioning and adjust the stop if necessary.

Proceed to Section 3.5, FINAL INSTALLATION.

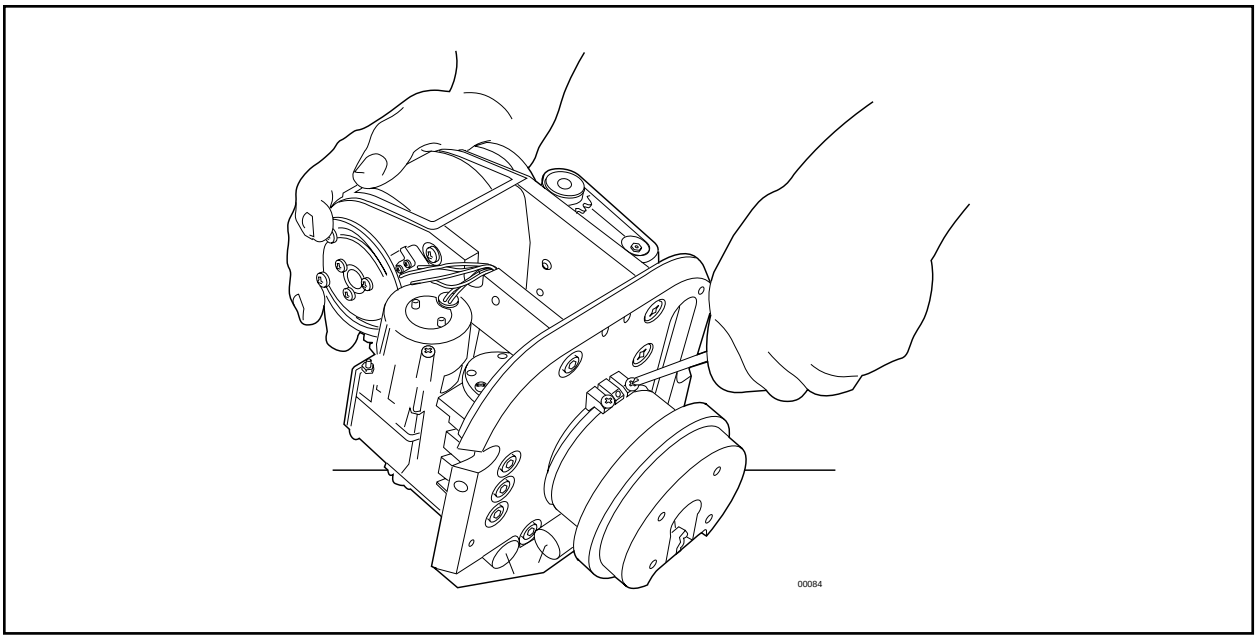


Figure 8. Pan Limit Adjustment

3.5 FINAL INSTALLATION

1. If the pan/tilt is installed in an inverted position, refer to Figure 9 and apply RTV silicone (such as Bostik #9732 or equivalent) to the shaded areas of the covers.

2. Replace the covers.

   a. Refer to Figure 10 and grasp one cover half in each hand and position the covers on each side of the pan/tilt unit.

   b. Bring the two cover halves together, aligning the two pins in one cover half with the mating holes in the other cover half.

   c. When the cover halves are together, press downward, as shown in Figure 11, to force the covers into their latches.

   d. Replace the screws in the covers.

3. If the pan/tilt is installed in an upright position, refer to Figure 12 and apply RTV silicone (such as Bostik #9732 or equivalent) to the shaded areas of the covers.

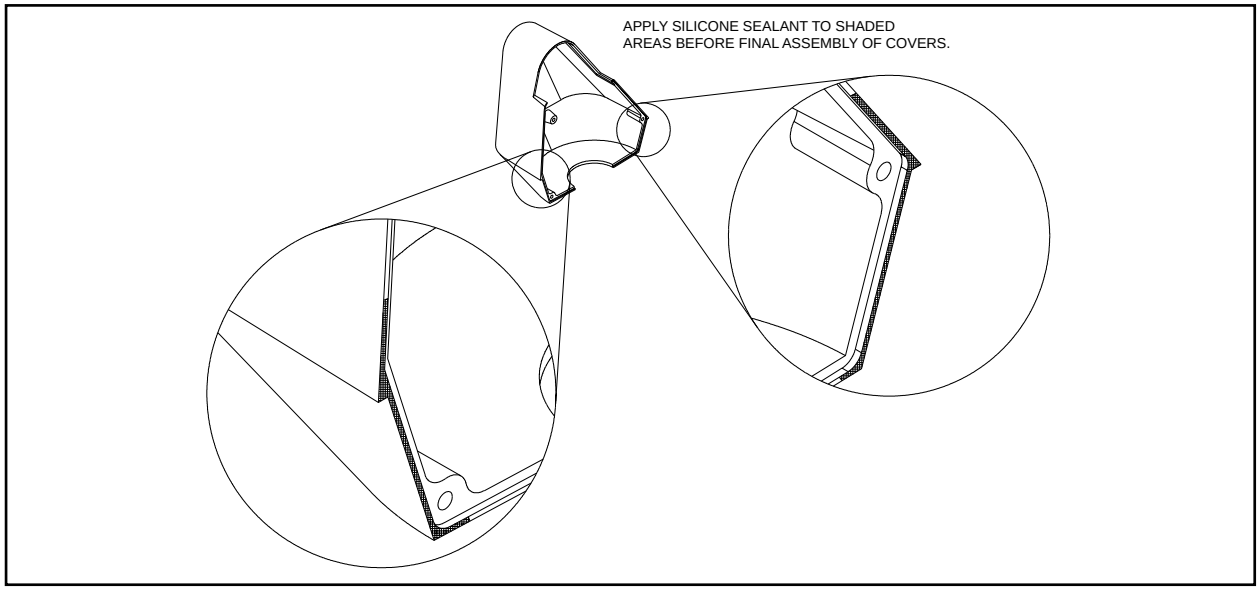


Figure 9. Silicone Application Locations for Inverted Unit

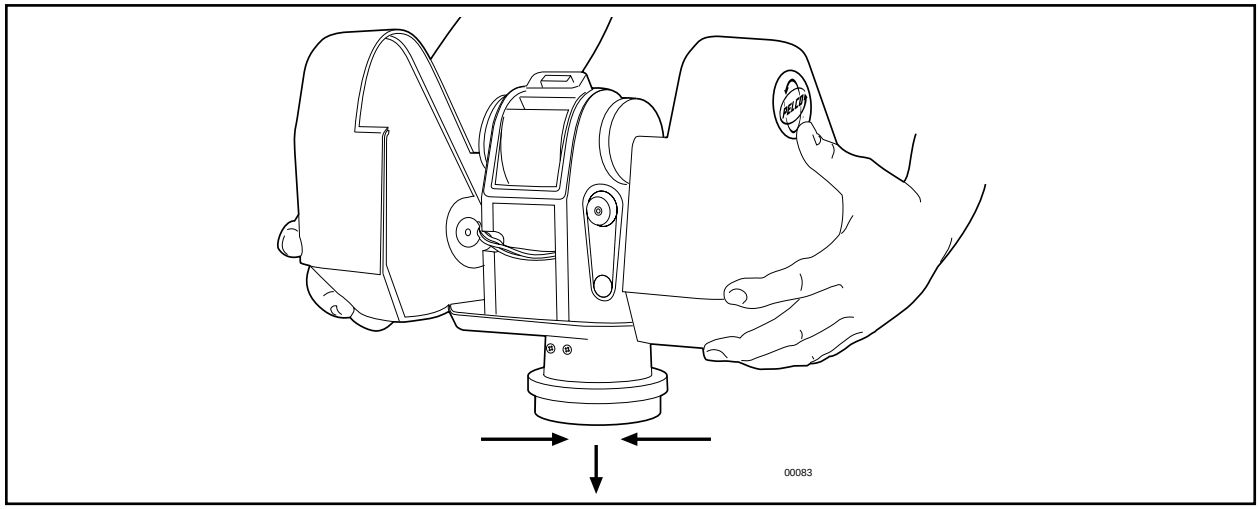


Figure 10. Replacing the Cover Halves

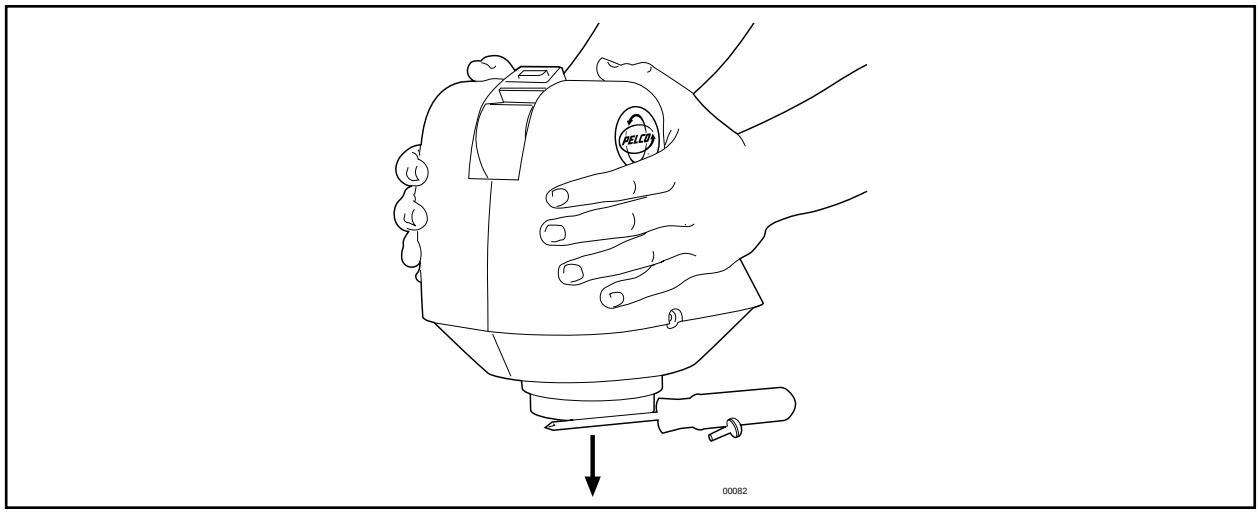


Figure 11. Securing the Cover Halves

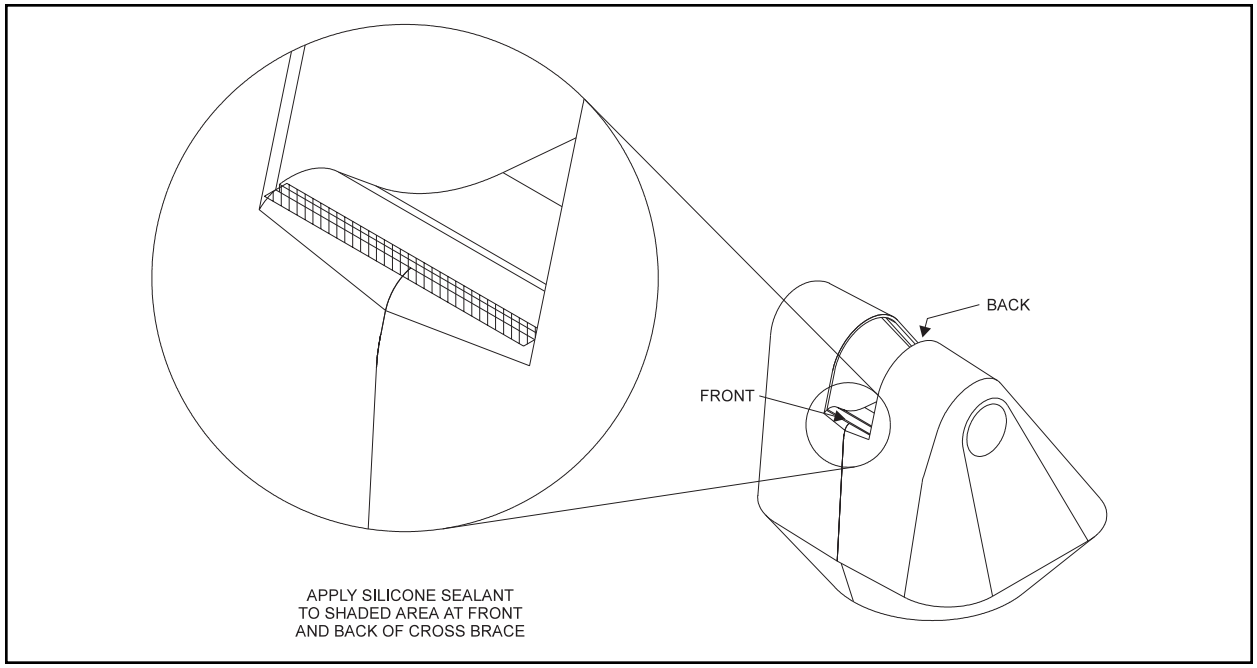


Figure 12. Silicone Application Location for Upright Unit

4.0 OPERATION

Refer to the manual for your control equipment for operating the pan/tilt unit.

If your enclosure has the heater blanket option, it is thermostatically controlled to turn on at 40°F (4.44°C) and turn off at 60°F (15.56°C). The heater blanket allows operation of the pan/tilt unit to -50°F (-45.56°C).

5.0 MAINTENANCE

If you need to remove the enclosure, protect the RediLINK™ connector area against moisture, dust, dirt, etc. Failure to do so could result in a bad connection. Also, damage to the pan/tilt unit or enclosure could occur when power is turned on.

The following servicing should be done every six months with average use.

1. Remove the PT780's outer casing. (Refer to step 1 under Section 3.4, PAN AND TILT STOP LIMIT ADJUSTMENTS.)

2. Inspect the gaskets around the cover, tilt shaft, and spindle for damage.

3. Refer to Figure 13. It shows the parts locations of the tilt assembly. Look for similar orientations of parts when adjusting the pan assembly.

4. Check the backlash adjustment.

   Backlash is the slack or binding in a pan and tilt base mount. Determine backlash by lifting the mount assembly, grasping the base, and wiggling it. There should not be any play or binding between the gear (A) and worm drive (B). Play or binding indicates a backlash problem.

- One backlash problem involves a worm and worm gear connection loose enough to cause slipping or tight enough to cause binding.

- The second involves a too-loose or too-tight chain, usually causing symptoms similar to the worm and worm gear problem—slipping or binding.

   a. Verify that the worm drive (B) is fully seated in the worm gear (A). If it is not:

   (1) Locate the worm-driven gear for either the pan or the tilt motor linkage. Loosen the three hex screws (F) holding the worm in place, but leave enough thread in place to hold the assembly on the mount.

   (2) Using your thumbs, gently move the worm forward or pull the assembly back from the worm gear to either tighten or loosen the gear spacing to the worm gear. Move the base of the pan and tilt to check the adjustment.

   (3) If you get movement in the base, press a finger down in the middle of the worm assembly. If you get no movement in the base, use your thumb and forefinger to pull the worm assembly back until you get movement.

   (4) When the spacing is correct, tighten the hex screws. Start with the middle screw to ensure proper spacing.

   (5) Remove the screw (C) in the gear train nut (D).

   (6) Tighten the gear train nut to remove any play.

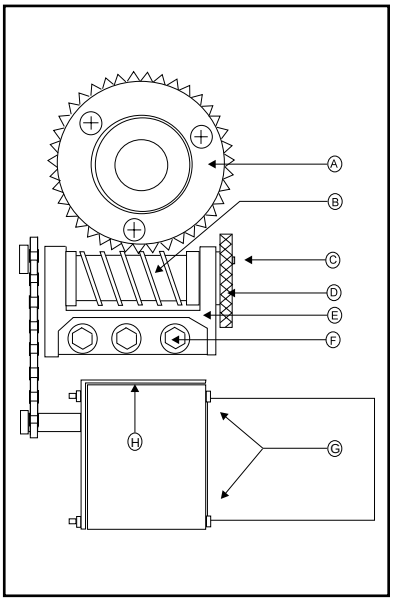


Figure 13. Pan/Tilt Adjustments

(7) Line up the hole in the gear train nut with the nearest hole in the gear train bracket (E).

(8) Replace the screw.

b. Refer to Figure 13. Adjust chain tension, if needed:

(1) Locate the pan or tilt motor on the assembly. Loosen the hex screws (G) that hold the motor to its mounting bracket. Depending on which motor assembly you are adjusting, there will be either three (pan) or four (tilt). (Only two screws are shown in Figure 13.)

(2) Using a screwdriver, pry the motor down at H to tighten for the correct chain tension. (You should not be able to freely move the motor with your finger, nor should it be so tight that it will not move at all as this usually leads to binding.)

(3) Tighten the hex screws.

c. Using a controller, you should now be able to move the PT780 without looseness or binding. If you have any problems, contact Pelco's Technical Support Department.

5. Lubricate the chains. Use a Teflon chain lubricant, such as TriFlon™.

6. Replace the covers. (Refer to step 2 under Section 3.5, FINAL INSTALLATION.) When you reinstall the covers, apply new silicone sealant as shown in Figures 9 and 12.

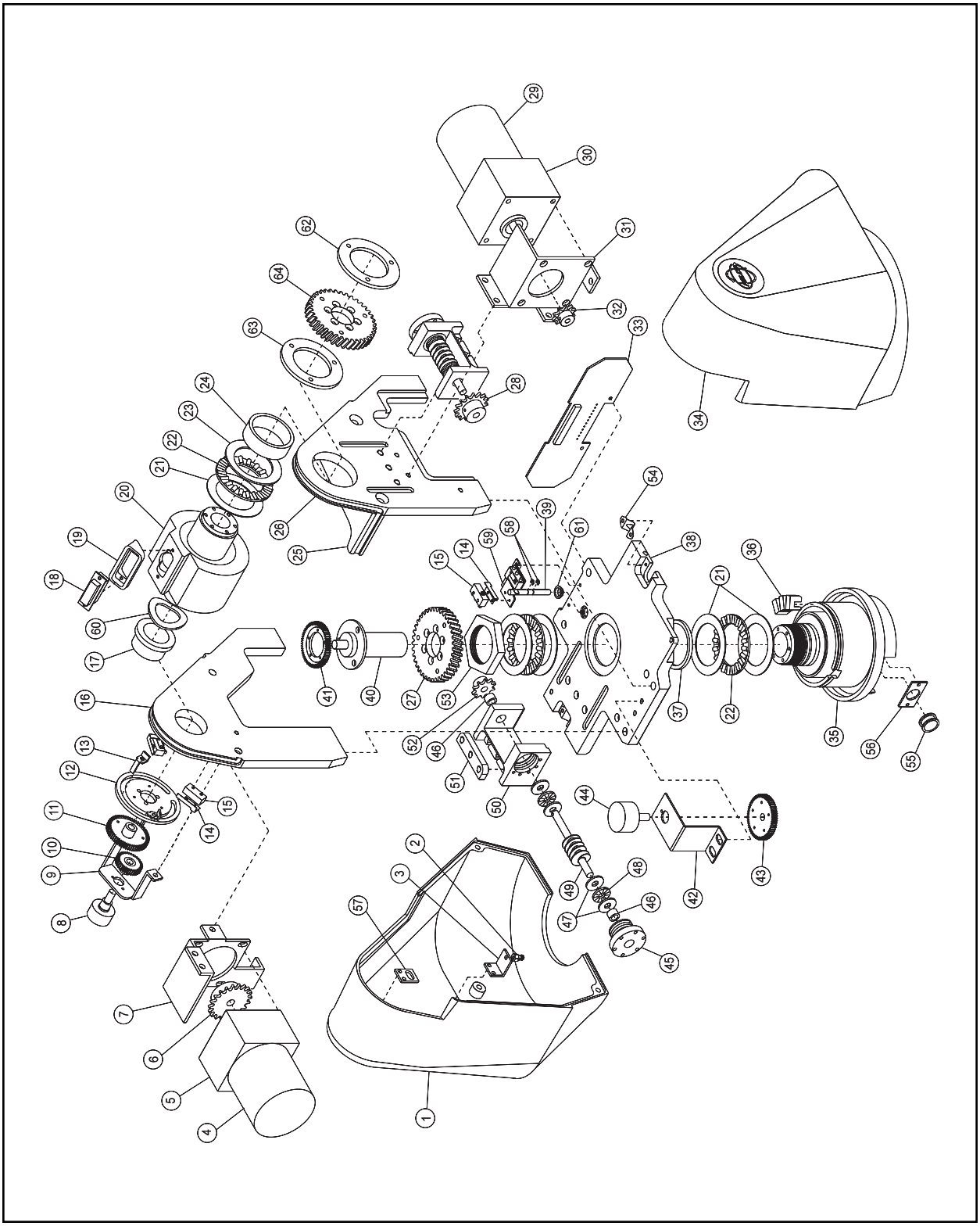


Figure 14. Exploded Assembly Diagram of Mechanical Parts

Table D. Mechanical Parts List (Figure 14)

Item	Quantity	Description	Part Number
1	1	Cover, pan side	9064003COMP
2	2	Ball stud	PT180410000
3	2	Ball stud bracket	9064010COMP
4	1	Pan motor, 24 VAC	5708007
5	1	Pan motor gearhead	1758006
6	1	Pan motor sprocket	5804010ACOMP
7	1	Pan motor bracket	9064006COMP
8	1	Tilt preset potentiometer	POTP010.0K*
9	1	Tilt potentiometer bracket	9064012COMP*
10	1	Gear, 32 teeth	28010017*
11	1	Gear, 52 teeth	28010016*
12	1	Tilt limit ring	9004012COMP
13	2	Tilt limit stop	1554050COMP
14	4	Actuator, with insulator	SWIJS138B
	2**		
15	4	Switch	SWI1SM1
	2**		
16	1	Upright, pan side	9064002COMP
17	1	Bushing, pan side	PT250010004
18	1	26-pin, subminiature, D-type socket	COND226S
19	1	Tilt shaft connector guide	9004015COMP
20	1	Tilt shaft feed-through	9004000COMP
21	5	Thrust washer, .030"	90010002
22	3	Thrust bearing	90010001
23	1	Thrust washer, .060"	90010024
24	1	Bronze bushing	90010006
25	1	Cross-brace uprights	9064008COMP
26	1	Upright, tilt side	9064001COMP
27	1	Worm gear, 40 teeth	90010009
			9004024COMP***
			9004025COMP****
28	1	Sprocket	90010028
29	1	Tilt motor, 24 VAC	5808000
30	1	Tilt motor gearhead	5808001
31	1	Tilt motor bracket	9064005COMP
32	1	Sprocket	5804022COMP
33	1	Circuit board assembly, 24 VAC	PCB9061000ASSY
34	1	Cover, tilt side	9064004COMP
35	1	Pan spindle	9004001COMP
36	3	Pan limit stop	5804006COMP*****
37	1	Bronze bushing	90010029
38	1	Base	9064007COMP
39	1	Pan limit stop	1554049COMP*****
40	1	Slip ring	250010000***
			28010000******
41	1	Preset gear, pan spindle	9004017COMP***
			9004022COMP****

* PP models only
** All SL models
*** SL/PP model only
**** Non-360° PP models
***** Not on SL models
****** SL model

Continued on next page

Table D. Mechanical Parts List (continued)

Item	Quantity	Description	Part Number
42	1	Pan potentiometer bracket	9004008COMP
43	1	Gear, 56 teeth	90010020*
44	1	Pan preset potentiometer	POTDARM010.0K***
			POTP010.0K****
45	2	Gear train nut	9004009COMP
46	4	Bronze bushing	5806005
47	8	Thrust washer	5806003
48	4	Thrust bearing	5806002
49	2	Worm	90010008
50	2	Gear train bracket	9004005COMP
51	1	3-position bar nut	9004006COMP
52	1	Sprocket	PT18004003COMP
53	1	Pan spindle nut	9004004COMP
54	2	Ball stud receiver	90010030
55	1	Grommet, 3/8" ID	GRO2175
		Grommet, 1/4" ID	GRO2170**
56	1	Wire clamp	9004020COMP*****
			9004021COMP**
57	2	Eyelet service bracket	9004023COMP
58	2	Snap ring	15510000*****
59	1	Pan limit switch bracket	1554051COMP*****
60	1	Wave spring	90010017
61	1	Grommet	GRO2172N*****
62	1	Unthreaded backup plate	9064015COMP
63	1	Threaded backup plate	9064014COMP
64	1	Worm gear	90010009
The following items are <u>not</u> shown:			
65	1	Pan chain assembly, 29 pitch	9061002ASSY
66	1	Tilt chain assembly, 35 pitch	9061003ASSY
67	1	2-position plastic connector	CON640428-2
68	6	3-position plastic connector	CON640428-3
69	1	6-position plastic connector	CON640428-6
70	2	Cover labels	LBL19000
71	1	Dust protector, 26-pin, subminiature, D-type socket	90010025
72	1	37-pin connector plug (installed on cable)	CON206305-1
73	37	Connector pins	CON66400-1
74	1	Cable connector clamp	CON206138-1
75	1	37-pin connector socket assembly (loose equipment) Includes 37-position housing, boot, sockets, cable clamp	CONA37S

* PP models only
** All SL models
*** SL/PP model only
**** Non-360° PP models
***** Not on SL models
****** SL model

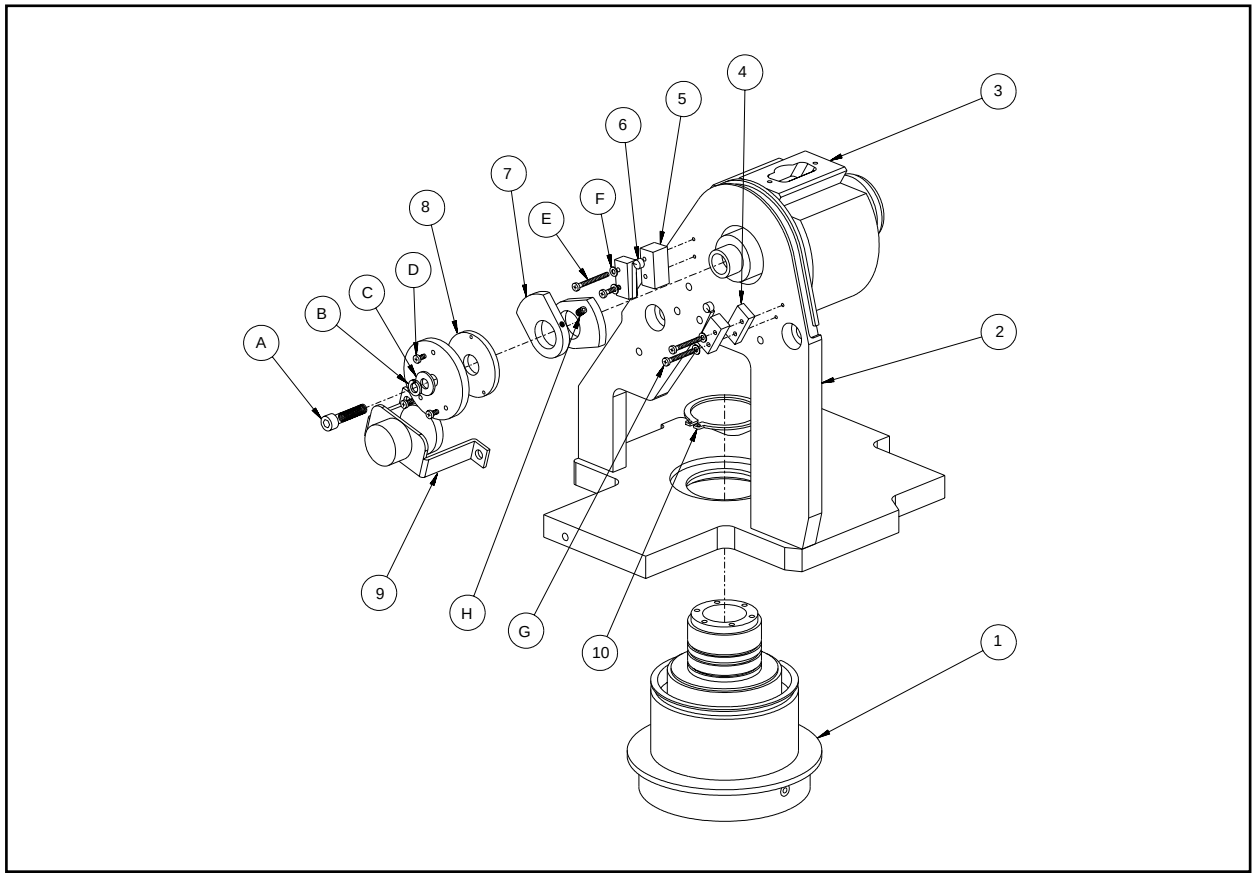


Figure 15. Exploded Assembly Diagram of Mechanical Parts (Modifications to Figure 14)

Table E. Mechanical Parts List (Figure 15)

Item	Quantity	Description	Part Number
1	1	Pan spindle	9004027COMP
2	1	Upright, pan side	9064016COMP
3	1	Tilt shaft	9004028COMP
4	1	Switch spacer (.176")	9064019COMP
5	1	Switch spacer (.408")	9064020COMP
6	2	Switch actuator	SWIJS5
7	2	Limit switch cam	9064018COMP
8	1	Potentiometer gear mount	9064021COMP
9	1	Potentiometer bracket	9064017COMP
10	1	Pan spindle snap ring	80010019
A	1	Allen screw, 10-32 x 1.00"	ZH10-32X1.00CS
B	1	Split lock washer	ZH10LWSSL
C	1	Flat washer, #10	ZH204X436X60C
D	3	Screw, 2-56 x .250", pan head, Phillips	ZH2-56X.250SPP
E	2	Screw, 2-56 x .875", pan head, Phillips	ZH2-56X.875SPP
F	4	Star lock washer, #2	ZH2LWSIS
G	2	Screw, 2-56 x .750", pan head, Phillips	ZH2-56X.750SPP
H	2	Set screw, 6-32	ZH6-32X.187S

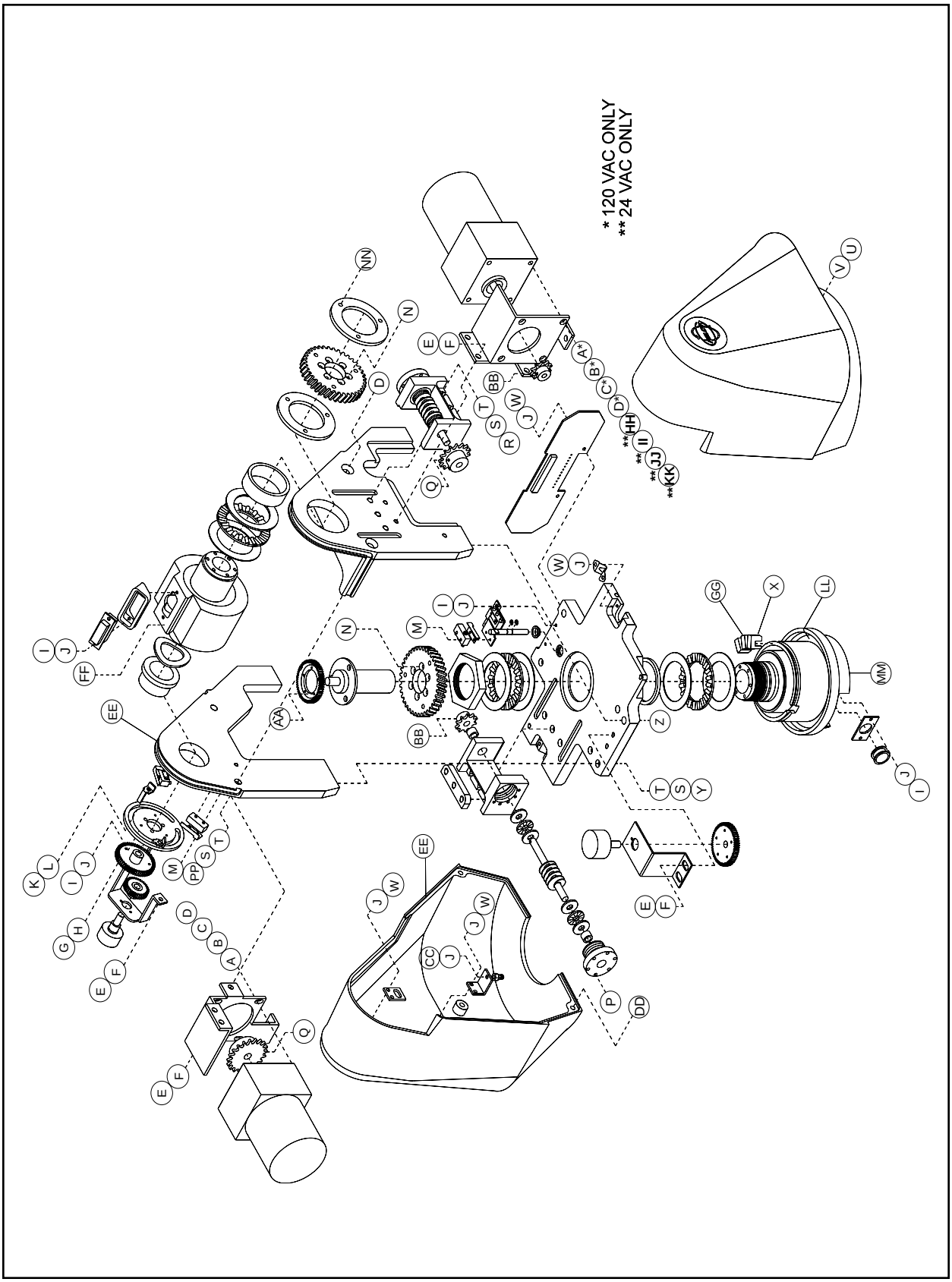


Figure 16. Exploded Assembly Diagram of Hardware

Table F. Hardware Parts List (Figure 16)

Refer to Figure 15 and Table E for modifications to this list.

Item	Quantity	Description	Part Number
A	4	Screw, 6-32 x 2 1/2-inch, pan head, Phillips	ZH6-32X2.50SPP
B	4	Flat washer	ZH932X1.75X130
C	4	Split lock washer, #6	ZH6LWSSL
D	4	Hex nut, 6-32	ZH6-32NUTSH
E	12	Allen screw, 10-32 x 3/8-inch	ZH10-32X.375SSS
F	12	Split lock washer, #10	ZH10LWSSL
G	3	Screw, 2-56 x 3/8-inch, pan head, Phillips	ZH2-56X.375SRS
H	3	Internal star washer, #2	ZH2LWSIS
I	9	Screw, 4-40 x 3/8-inch, pan head, Phillips	ZH4-40X.375SPP
J	25	Internal star washer, #4	ZH4LWSIS
K	2	Screw, 8-32 x 1/4-inch, pan head, Phillips	ZH8-32X.250SPP
L	2	Internal star washer, #8	ZH8LWSIS
M	8	Screw, 2-56 x 7/16-inch, pan head, Phillips	ZH2-56X.437SPP
N	12	Screw, 6-32 x 1/2-inch, flat head, Phillips	ZH6-32X.500FPF
O	2	Bolt, 1/4-20 x .625-inch, flat head, Phillips	ZH1/420X.625SFS
P	2	Screw, 4-40 x 5/8-inch, pan head, Phillips	ZH4-40X.625SPP
Q	2	Roll pin	ZHPIN3/31X3/4R
R	6	Allen bolt, 1/4-20 x 1/2-inch	ZH1/420X1.50SS
S	11	Flat washer, 1/4	ZH260X562X65C
T	11	Split lock washer, 1/4	ZH1/4LWSSL
U	2	Screw, 10-32 x .875-inch, gray	ZH10-32X.875GRY
V	2	Thread sealing washer	PS3010002
W	14	Screw, 4-40 x .250-inch, pan head, Phillips	ZH4-40X.250SPP
X	2	Screw, 6-32 x .375-inch, pan head, Phillips	ZH6-32X.375SPP
Y	3	Allen bolt, 1/4-20 x 3/4-inch	ZH1/420X.750SS
Z	3	Bolt, 1/4-20 x 3/4-inch, flat head, Phillips	ZH1/420X.750SFS
AA	2	Self-tapping screw, 6-32	ZH6-SAX.250CPP
BB	2	Roll pin	ZHPIN3/23X1/2R
CC	2	Allen screw, 4-40 x .250-inch	ZH4-40X.250SS
DD	2	Dowel pin	90010004
EE	1	Cover gasket	90610010
FF	1	Tilt shaft gasket	90010014
GG	1	Set screw, 6-32 x 3/16-inch	ZH6-32X.187S
HH	4	Screw, 8-32 x 2 1/2-inch, pan head, Phillips,	ZH8-32X2.50CPS
II	4	Flat washer	ZH932X1.75X130
JJ	4	Split lock washer, #8	ZH8LWSSL
KK	4	Hex nut, 8-32	ZH8-32NUTSH
LL	1	Spindle cover gasket	90010003
MM	1	Spindle mount gasket	90010012
NN	3	Screw, 10-32 x 3/4-inch, pan head, Phillips	ZH10-32X.750SPP
PP	2	Allen bolt, 1/4-20 x .625-inch	ZH1/420X.625CS

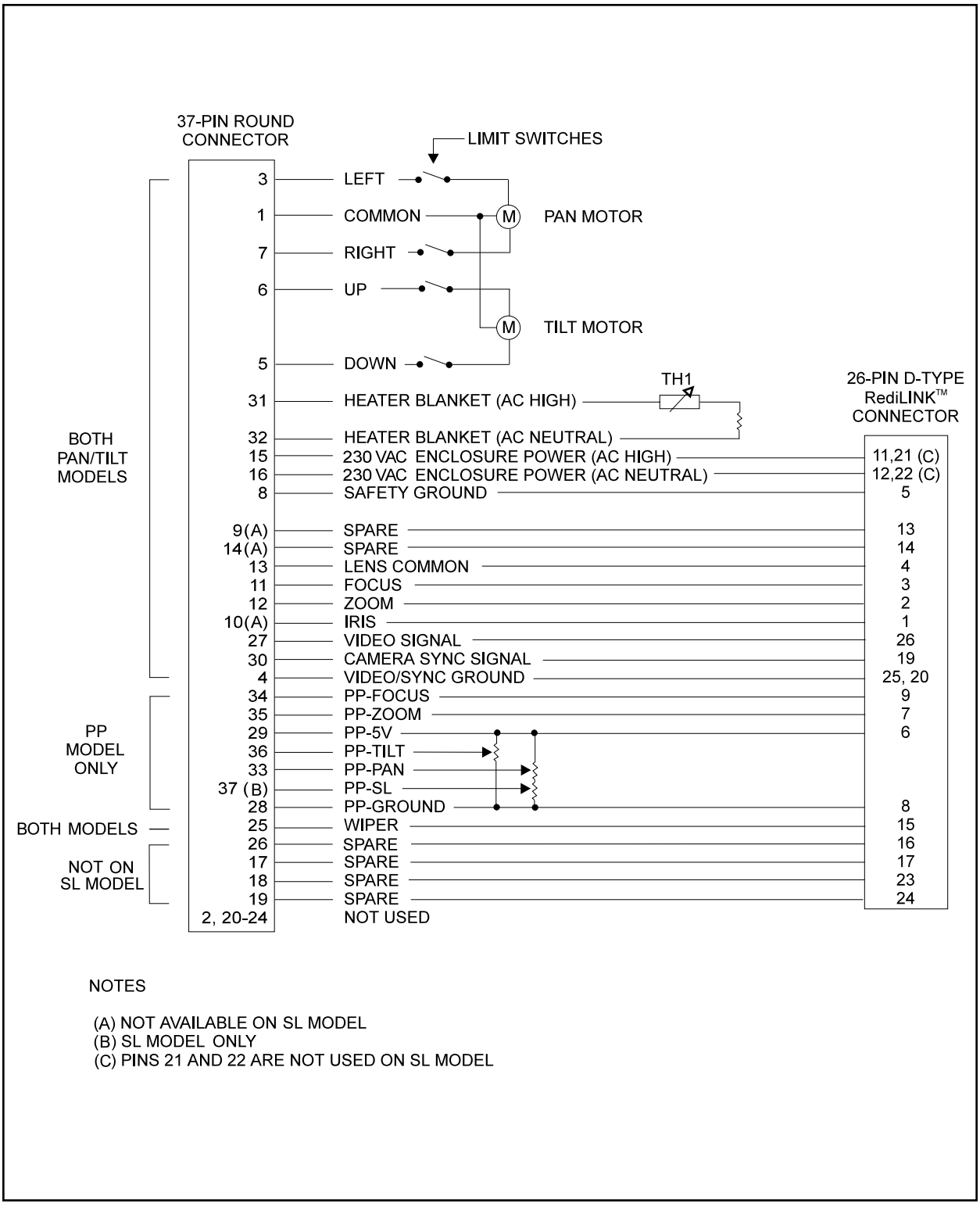


Figure 17. PT780-24P/PPPSA and PT780-24SL/PPSA Wiring Diagram

8.0 SPECIFICATIONS

MECHANICAL

Pan Rotation:	Movement in horizontal plane: 0-355° 0-360° (SL model only)
Pan Speed:	9°/sec +/-1° (no load condition)
Tilt Rotation:	90° down from horizontal 60° up from horizontal
Tilt Speed:	3°/sec +/-.5° (no load condition)
Torque Output:	23.8 ft. lb (32.3 N·m) at rated voltage and 75° (23.9°C)
Maximum Load:	52 lb (23.55 kg) at specified torque
Pan/Tilt Drive System:	Delrin™ worm gear. Ground and polished stainless steel worm
Pan/Tilt Bearings:	Roller thrust bearings and bronze Oilite bushings
Lubricants	
Bearings:	NLGI #2; Lithium complex grease fortified with molybdenum
Chain:	Teflon chain lubricant (for example, TriFlon™)
Braking:	Friction

ELECTRICAL

Input Voltage:	24 VAC, 50/60 Hz

vA Required:

Input Voltage	**24 VAC**
Pan	21.6 vA (.9 A)
Tilt	24 vA (1 A)
Total vA Required	45.6 vA (1.9 A)

Maximum Current:	2 amps per conductor (SL models only)
Connectors:	Amp CPC type, mate supplied (37 pins)
Motor Type	Single phase, instantaneous reversing, induction type. 120 VAC or 24 VAC, 50/60 Hz, impedance protected. 50% duty cycle; 30-minute rating
Limit Switches:	5 amp, 250 VAC maximum, 10 million cycle rating, internal adjustment

GENERAL

Construction	
Pan/Tilt:	Aluminum exterior; painted steel and aluminum interior parts
Worm Gear:	Delrin™ premium performance acetal
Worm Drive:	Ground and polished stainless steel
Dimensions:	See Figure 18
Environment:	Indoor/outdoor -10° to 140 °F (-23° to 60°C)
Weight	
Unit:	21.5 lb (9.68 kg) approximate
Shipping:	25 lb (11.32 kg)

(Design and product specifications subject to change without notice.)

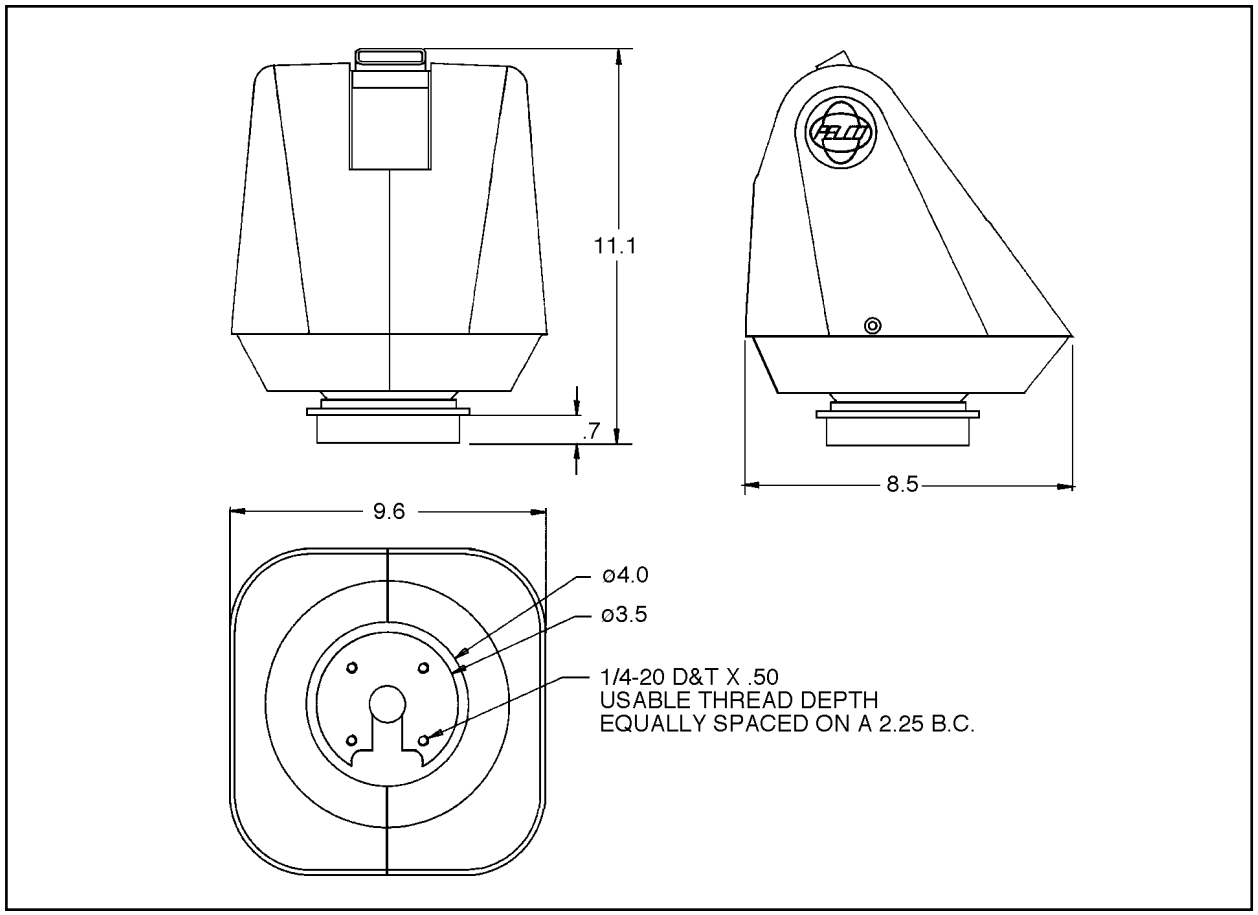


Figure 18. PT780-24P/PPPSA and PT780-24SL/PPSA Dimension Drawing

9.0 WARRANTY AND RETURN INFORMATION

WARRANTY

Pelco will repair or replace, without charge, any merchandise proved defective in material or workmanship for a period of one year after the date of shipment. Exceptions to this warranty are as noted below:

- Three years on Genex™ Series (multiplexers, server, and keyboard).
- Two years on all standard motorized and fixed focal length lenses.
- Two years on Legacy®, Intercept®, PV1000 Series, CM6700/CM8500/CM9500/CM9750/CM9760 Matrix, Spectra®, DF5 Series and DF8 Fixed Dome products.
- Two years on WW5700 series window wiper (excluding wiper blades).
- Two years on cameras.
- Six months on all pan and tilts, scanners or preset lenses used in continuous motion applications (that is, preset scan, tour and auto scan modes).

Pelco will warranty all replacement parts and repairs for 90 days from the date of Pelco shipment. All goods requiring warranty repair shall be sent freight prepaid to Pelco, Clovis, California. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty.

Pelco assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application made of the Products. Pelco's liability for any claim, whether based on breach of contract, negligence, infringement of any rights of any party or product liability, relating to the Products shall not exceed the price paid by the Dealer to Pelco for such Products. In no event will Pelco be liable for any special, incidental or consequential damages (including loss of use, loss of profit and claims of third parties) however caused, whether by the negligence of Pelco or otherwise.

The above warranty provides the Dealer with specific legal rights. The Dealer may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, the Dealer must contact Pelco at (800) 289-9100 or (559) 292-1981 to obtain a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or Pelco invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Ship freight prepaid to: Pelco
300 West Pontiac Way
Clovis, CA 93612-5699

Method of return shipment shall be the same or equal to the method by which the item was received by Pelco.

RETURNS

In order to expedite parts returned to the factory for repair or credit, please call the factory at (800) 289-9100 or (559) 292-1981 to obtain an authorization number (CA number if returned for credit, and RA number if returned for repair). Goods returned for repair or credit should be clearly identified with the assigned CA/RA number and freight should be prepaid. All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge.

Ship freight prepaid to: Pelco
300 West Pontiac Way
Clovis, CA 93612-5699

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